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Current Concepts

Trigger Finger: Evaluation, Management, and Outcomes

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Trigger finger is a common hand condition with a lifetime prevalence of 2-3% of the adult population. It is a common cause of hand disability. Management begins conservatively with observation, orthotic immobilization and corticosteroid injections. Joint blocking orthoses can improve function and provide pain relief, particularly in those with less severe disease. Corticosteroid injections can also be offered with the effectiveness approaching 80% in some studies, although this can vary with disease severity and number of digits involved. Corticosteroid injections can safely be offered to diabetic patients and can be offered to all patients prior to undergoing surgical release. Surgical release should not be performed within three months of corticosteroid injection due to increased risk of infection. For patients with continued issues following conservative management, surgical release of the A1 pulley provides excellent results and remains the most effective and reliable treatment offered. This can be performed by open release or percutaneously. The wide-awake local anesthesia with no tourniquet (WALANT) anesthesia has gained popularity with this procedure due to improved patient outcomes and cost effectiveness.

INTRODUCTION

Trigger finger, also known as stenosing flexor tenosynovitis, is a commonly encountered hand condition with a lifetime prevalence of 2-3% in the adult population.[1,2] Trigger finger is more commonly present in women in the long and ring fingers of the dominant hand.[3] There is an increased incidence in diabetic patients who also tend to develop more severe diseases.[1,2,4] Trigger finger is caused by inflammation and thickening of the first annular (A1) pulley that results in restricted motion and catching of the flexor tendon.[2] Functional limitations, including difficulty with grasping, holding objects, and fine motor activities, can result.

REVIEW

EVALUATION

Trigger finger is a clinical diagnosis based on patient history and physical examination but can present in various ways. An early complaint of trigger finger may be painless clicking at the metacarpophalangeal (MCP) joint level with finger flexion.[3] Further progression can cause catching of the flexor tendon on the A1 pulley that becomes painful with flexion and extension. Tenderness is often appreciated over the palmar MCP, directly over the A1 pulley. A palpable nodule may also be present. Patients may also complain of pain over the MCP or proximal interphalangeal (PIP) joints with motion.[3] Additionally, fullness and stiffness of the affected MCP joint are common. This often presents with stiffness that is worse in the morning. Patients can report a locked finger upon awakening that improves throughout the day. Further progression can result in a locked finger that requires manual manipulation to extend the finger fully. Without treatment, this may result in a fixed flexion contracture of the finger. The Green classification can be utilized to define further and report clinical findings of the trigger finger.[5] This classification ranges from grade I, or pretriggering, which is classified as pain over the A1 pulley, to grade IV, or contracture, which is a fixed flexion contracture at the PIP joint [**Table 1**].[5]

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Table 1. Green Classification of Trigger Finger[5]

Grade	Clinical Findings
I (Pretriggering)	Pain, patient-reported catching, tenderness over A1 pulley
II (Active)	Catching with intact extension of digit on physical examination
III (Passive)	
IIIA	Catching corrected with passive extension of digit
IIIB	Loss of active flexion
IV (Contracture)	Catching with fixed flexion contracture of the PIP joint

A1: Annular 1; PIP: proximal interphalangeal joint

CONSERVATIVE MANAGEMENT

Conservative management of the trigger finger includes observation, activity modification, orthotic immobilization, hand therapy, non-steroidal anti-inflammatory medications, and corticosteroid injections.[1,3] Although the natural history of trigger finger has not been fully elucidated, *McKee et al.*[6] found that 52% of the patients in their 348 person cohort had complete resolution of trigger finger symptoms by eight months without any treatment. Ninety percent of this cohort had complete resolution of symptoms at one year. Additionally, they found that the thumb was the most frequent digit to resolve without treatment. However, they did not specify the severity or grade of trigger fingers within their study. *Lundsford et al.*[3] performed a systematic review of orthosis management with patient-reported success rates ranging from 47% to 93%. The position of immobilization varied amongst studies but included immobilizing the MCP joint at 10-to-15° of flexion, the MCP joint at neutral, or the distal interphalangeal (DIP) joint in full extension. Additional immobilization techniques included inhibiting PIP joint motion and night-time orthoses. The average amount of time in the orthosis was six weeks. They recommended an initial trial of six weeks in an orthosis with continued immobilization to 12 weeks if patients remained symptomatic at six-week follow-up. *Teo et al.*[7] evaluated proximal interphalangeal joint-blocking orthosis compared with the metacarpophalangeal joint-blocking orthosis in patients with Green's grade two or three trigger fingers classification. They recommended orthosis wear of 24 hours for more than eight weeks. While both orthoses were effective in pain reduction and an improvement in triggering symptoms, proximal interphalangeal joint-blocking orthoses were superior and less restrictive, with 48% of patients improving at least one Green's classification grade.

CORTICOSTEROID INJECTIONS

Local administration of corticosteroid injections has been shown to relieve trigger fingers, with reported rates ranging from 45 to 80% following a single injection.[8] Corticosteroid injections improve trigger finger symptoms by reducing flexor tendon and A1 pulley size and inflammation.[1] Success rates can vary based on disease severity and the number of affected digits and injections. In a prospective analysis of 99 trigger fingers, *Shultz et al.*[8] found that patients with multiple trigger fingers were 5.8 times more likely to have persistent symptoms following a corticosteroid injection at one month than those with a single affected one digit. Additionally, the odds of failing treatment doubled for each increase in the trigger finger stage. In a retrospective case series analysis of 292 repeat injections, *Dardas et al.*[9] found that in patients with repeat trigger finger injections, 39% of second and third corticosteroid injections provided long-term relief at a minimum of one and a half years. Although there is evidence of a decrease in effectiveness with subsequent injections, this should be offered to patients who prefer continued nonsurgical treatment.

Although diabetics tend to have a higher severity and incidence of multiple trigger fingers, recent studies show similar efficacy of corticosteroid injections compared to non-diabetics.[8,9] Surgeons may hesitate in providing corticosteroid injections to diabetics due to transient increases in blood glucose. However, in a prospective analysis involving 32 patients undergoing upper extremity corticosteroid injections, *Twu et al.*[10] found no significant increases in fasting or postprandial blood glucose levels up to seven days post-injection. This contrasts previous studies demonstrating transient blood glucose elevations in diabetic patients following corticosteroid injections.[4,11]

Corticosteroid injections remain an effective treatment option for trigger fingers. However, they may increase the risk of infection following surgical release. In a retrospective study of 999 trigger fingers managed with the surgical release, *Ng et al.*[12] found that patients who received a preoperative corticosteroid injection were significantly more likely to develop a postoperative infection. Of those patients, a shorter interval between injection and surgery significantly increased the risk of developing a postoperative infection. Similar findings were documented by *Matzon et al.*[13] in a retrospective analysis of 2480 trigger fingers in 1857 patients who underwent surgical release. Patients who developed a deep infection postoperatively were 9.38 times more likely to have received a corticosteroid injection preoperatively and were 6.51 times more likely to have received that injection within 90 days of surgery. In a query of insurance claims, *Straszewiski et al.*[14] found that an even shorter interval of 1 month between surgery and corticosteroid injection increased the odds of developing a postoperative infection requiring surgical debridement at 60 and 90 days postoperatively.

OPERATIVE MANAGEMENT

Open or percutaneous release of the A1 pulley is typically performed in the setting of failed conservative management and severe disease. In an open surgical release, a small incision is used to incise the A1 pulley longitudinally. The skin incision can be placed longitudinally, transversely, or within the distal palmar crease to access the A1 pulley for release. Alternatively, the percutaneous release of the A1 pulley is performed by gliding the sharp edge of a needle

longitudinally along the pulley with the digit in a hyperextended position to reduce the risk of a neurovascular injury. Release of the pulley is assessed by loss of a grating sensation along the pulley and by having the patient actively range the finger.[15]

OPEN RELEASE

Open surgical trigger finger release remains the most effective treatment modality, with success rates nearing 100%.[16] Patients with a long duration of preoperative symptoms, flexion contracture of the PIP joint, and fraying or partial tear of the flexor tendon may be at increased risk of prolonged symptoms such as pain, reduced range of motion, catching and locking, among others despite surgical release.[17]

Reported complication rates following open trigger finger release vary considerably in literature, likely due to discrepancies in defining complications.[18] In a retrospective study of 3,428 patients undergoing surgical trigger finger release, *Koopman et al.*[18] reported that 16% of patients incurred a complication, with only 2% requiring operative management. Treatment of the dominant hand, longer symptom duration, three or more preoperative corticosteroid injections, and corticosteroid injections within three months before surgery were significantly associated with higher complications.

In a retrospective analysis of 191 patients who underwent surgical release, *Ho et al.*[19] found similar complication rates and postoperative satisfaction among diabetics and nondiabetics. *Stirling et al.*[20] demonstrated similar improvement in Quick Disabilities of Arm, Shoulder, and Hand (QuickDASH) and patient satisfaction in diabetics and non-diabetic patients undergoing surgical release. However, diabetic patients reported significantly worse pre- and postoperative QuickDASH scores. Alternatively, *Federer et al.*[21] demonstrated a significantly higher all-cause complication rate (26.3% vs. 13.0%) in diabetics compared to matched non-diabetics which was attributed to a significantly higher rate of a limited postoperative range of motion in diabetic patients. They found no significant differences in infection rates or delayed wound healing.

In comparing open release to conservative management, *Hansen et al.*[16] performed a prospective randomized controlled trial of 165 patients. It demonstrated a success rate of 99% at three and 12 months postoperatively in the open release cohort compared to 86% and 49% at three and 12 months, respectively, in patients undergoing ultrasound-guided corticosteroid injections. Postoperative pain was significantly higher in the ultrasound-guided corticosteroid injection group at all time points compared to surgical release. However, there was a higher incidence of complications such as neuroma, superficial infection, and cutaneous discomfort surrounding the surgical incision in the surgical group.

PERCUTANEOUS RELEASE

Percutaneous release of the A1 pulley is well-documented in literature, with reported success rates approaching 95%.[22,23] *Xie et al.*[22] randomized 76 patients into open or percutaneous release and found no difference in DASH, finger range of motion, or symptom recurrence. However, some authors cite an increased risk of incomplete release, scar formation, nerve injury, and recurrence.[23] As many hand fellowships do not provide routine exposure to this technique, surgeons may seek additional training before considering its implementation in their own practices.

WIDE-AWAKE LOCAL ANESTHESIA NO TOURNIQUET

Traditionally, the open surgical release was performed under varying anesthetic modalities such as local, regional, and general, and monitored anesthesia care using a tourniquet for adequate hemostasis and visualization of the surgical site. Alternatively, Wide-Awake Local Anesthesia No Tourniquet (WALANT) has grown in popularity due to improved patient outcomes and cost savings. The combination of lidocaine and epinephrine allows pain control while maintaining hemostasis without a tourniquet. It eliminates the need for monitored anesthesia care and intraoperative pain associated with tourniquet inflation.[24–26] Additionally, as the patient is awake and able to range their fingers immediately after A1 pulley release, this allows the surgeon to ensure that adequate release of the pulley is performed with no residual clicking or triggering.

In a randomized controlled trial of 86 patients undergoing open trigger finger release, *Rashid et al.*[24] found that physicians utilizing WALANT reported a higher likelihood of good surgical field visibility than those using lidocaine with a tourniquet (74% vs. 44%). Additionally, WALANT has a purported benefit of reducing costs associated with trigger finger release. In a case study of 78 patients undergoing trigger finger release with WALANT compared to monitored anesthesia care, *Codding et al.*[25] found that using WALANT saved an average of $105 per case based on anesthesia reimbursement alone. They did not consider overhead costs associated with providing anesthesia, administering medications, and longer care in the recovery room, which would further increase savings if using WALANT. In their study, patients under WALANT spent a significantly shorter time in the recovery room before discharge than those under monitored anesthesia care (average 72.3 min versus 30.2 min). Both groups had similar total operating room and surgical times. Despite the many benefits of WALANT, patient selection is key for successful outcomes. WALANT may be relatively contraindicated in patients with vascular injuries or systemic diseases, increasing the risk of vasoconstriction-induced ischemia (Raynaud disease, Buerger disease, vasculitis), those with hypersensitivities to lidocaine or epinephrine, or patients with psychological conditions that may preclude a wide-awake procedure.[26]

CONCLUSION

Trigger finger is a common hand condition that is a leading cause of hand disability. Management of this condition should begin conservatively with orthotic immobilization at the MCP or PIP joint and corticosteroid injections. Prox-

imal interphalangeal blocking orthoses or MCP joint blocking orthoses in 0-15 degrees of joint flexion can be utilized based on surgeon preference. Corticosteroid injections should be offered to all patients, irrespective of diabetic comorbidities, before surgical intervention. Surgery should not be performed within three months of corticosteroid injection. For those patients who fail conservative management, surgical intervention should be offered. WALANT anesthesia should be considered as it is a cost-effective alternative to traditional anesthesia that facilitates active pulley release trial to ensure no residual clicking or triggering.

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